

**IN THE UNITED STATES DISTRICT COURT  
FOR THE SOUTHERN DISTRICT OF TEXAS  
HOUSTON DIVISION**

US SYNTHETIC CORPORATION,

Plaintiff,

v.

ILJIN DIAMOND CO., LTD.; ILJIN HOLDINGS  
CO., LTD.; ILJIN USA INC.; ILJIN EUROPE  
GMBH; ILJIN JAPAN CO., LTD.; ILJIN CHINA  
CO., LTD.,

Defendants.

CIVIL ACTION NO.

COMPLAINT FOR PATENT  
INFRINGEMENT

**DEMAND FOR JURY TRIAL**

**COMPLAINT AND JURY DEMAND**

Plaintiff US Synthetic Corporation (“US Synthetic” or “Plaintiff”), by its undersigned counsel, for its Complaint against Iljin Diamond Co., Ltd. (“Iljin Diamond”), Iljin Holdings Co., Ltd. (“Iljin Holdings”), Iljin USA Inc. (“Iljin USA”), Iljin Europe GmbH (“Iljin Germany”), Iljin Japan Co., Ltd. (“Iljin Japan”) and Iljin China Co., Ltd. (“Iljin China”) (collectively, “Defendants”), states and alleges upon information and belief as follows:

**NATURE OF THE ACTION**

1. This is a civil action for patent infringement of U.S. Patent Nos. 10,508,502 (“the ’502 Patent”), and 10,507,565 (“the ’565 Patent”) (collectively, “patents-in-suit”) arising under the United States Patent Laws, Title 35, United States Code, § 1, *et. seq.*, and in particular under 35 U.S.C. § 271.

2. The patents-in-suit are related to polycrystalline diamond (“PCD”) and polycrystalline diamond compacts (“PDC” or “PDCs”). A true and accurate copy of the ’502

Patent is attached hereto as Exhibit A. A true and accurate copy of the '565 Patent is attached hereto as Exhibit B.

### **THE PARTIES**

3. US Synthetic is a corporation organized and existing under the laws of the State of Delaware and maintains a place of business at 1260 South 1600 West, Orem, Utah 84058.

4. US Synthetic is a subsidiary of ChampionX Corporation, which is headquartered at 2445 Technology Forest Blvd., Building 4, Suite 1200, The Woodlands, Texas 77381.

5. Iljin Holdings is a corporation existing and organized under the laws of the Republic of Korea, having a principal place of business at Iljin Building, 45, Mapo-daero, Mapo-gu, Seoul, Republic of Korea.

6. Iljin Holdings is in the business of, *inter alia*, manufacturing, marketing, and selling PDC products throughout the United States, including in Texas.

7. Iljin Diamond is a corporation existing and organized under the laws of the Republic of Korea, having a principal place of business at Iljin Building, 45, Mapo-daero, Mapo-gu, Seoul, Republic of Korea.

8. Iljin Diamond is in the business of, *inter alia*, manufacturing, marketing, and selling PDC products throughout the United States, including in Texas in concert with Iljin Holdings.

9. Iljin USA is a corporation existing and organized under the laws of Texas, having a principal place of business at 15995 N. Barkers Landing Rd. #310, Houston TX 77079, USA.

10. Iljin USA is in the business of, *inter alia*, manufacturing, marketing, and selling PDC products throughout the United States, including in Texas in concert with Iljin Holdings.

11. Iljin Germany is a corporation existing and organized under the laws of Germany, having a principal place of business at Kölner Str. 3, 65780 Eschborn, Germany.

12. Iljin Germany is in the business of, *inter alia*, manufacturing, marketing, and selling PDC products throughout the United States, including in Texas in concert with Iljin Holdings.

13. Iljin Japan is a corporation existing and organized under the laws of Japan, having a principal place of business at Hamamatsucho General B/L 7F, 2-2-15, Hamamatsu-cho, Minato-ku, Tokyo, 105-0013, Japan.

14. Iljin Japan is in the business of, *inter alia*, manufacturing, marketing, and selling PDC products throughout the United States, including in Texas in concert with Iljin Holdings.

15. Iljin China is a corporation existing and organized under the laws of China, having a principal place of business at 3F-C, BaoNa B/D (LP Tower), NC.25, Xianfeng St., Minhang District, Shanghai, 201103, China.

16. Iljin China is in the business of, *inter alia*, manufacturing, marketing, and selling PDC products throughout the United States, including in Texas in concert with Iljin Holdings.

17. Defendants are properly joined under Fed. R. Civ. P. 20(a)(2) because they have acted in concert with each other to develop, manufacture, import, market and/or sell the Accused Products and associated services in this district and throughout the United States, such that the relief requested in this action, arises out of the same transaction, occurrence, or series of transactions and will require resolution of common questions of law and/or fact.

#### **JURISDICTION AND VENUE**

18. Plaintiff incorporates by reference the prior paragraphs of this Complaint as if fully set forth herein.

19. This Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

20. This Court has personal jurisdiction over Defendants by virtue of, *inter alia*, their systematic and continuous contacts with Texas and because Defendants infringe the '502 and '565 Patents in Texas and in this judicial district. Among other things Defendants have offered for sale and sold, and continue to offer for sale and sell their infringing 1613 SSI products for importation, promotion, sales and distribution to resellers and end users throughout the United States, including in Texas and in this judicial district.

21. Defendants participate in or import into the United States, sell for importation into the United States, and/or sell after importation into the United States, one or more infringing products. Iljin Diamond manufactures industrial diamond products for the oil and gas industry and has “global business marketing infrastructure . . . established in Europe, Japan, Americas, China, etc.” for its products. Exhibit C. On its website, Iljin specifically features PDC products, stating that “PDC products of ILJIN Diamond have excellent durability, wear resistance, impact resistance and thermal resistance, saving the total drilling time.” Exhibit D. In a June 5, 2019, interview with Yonhap, Iljin president Byeon Jung-chul stated that “Iljin Diamond plans to step up its sales pitch with its polycrystalline diamond compact (PDC) cutter, which took nearly 10 years to develop, to capitalize on the growing U.S. drill market.” Exhibit E. Mr. Jung-chul also noted that “U.S. companies are leading the oil drilling industry and we expect to double our growth there . . . . We are thinking of expanding our production line late this year to meet the growing demand.” Exhibit E.

22. Defendants have thus infringed and continue to infringe the patents-in-suit directly, contributorily, and by inducement in the United States, in Texas and in this district. Defendants derive substantial revenue from their sales of infringing products to oil and gas

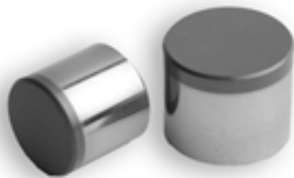
customers in Texas and in this judicial district, and Defendants purposefully avail themselves of the privilege of conducting activities in Texas, thus invoking the benefits and protections of the laws of Texas.

23. Venue is proper in this judicial district under 28 U.S.C. §§ 1391(b) and (c) against Defendants Iljin Holdings, Iljin Diamond, Iljin Germany, Iljin Japan and Iljin China because they are incorporated in foreign states and may be sued in any judicial district in the United States in which they are subject to the court's personal jurisdiction.

24. Venue is proper in this judicial district under 28 U.S.C. § 1400(b) against Iljin USA because Iljin USA is incorporated in, resides in, has a regular and established business in and has committed acts of infringement in Texas and in this District.

### **FACTS**

25. US Synthetic is headquartered in Orem, Utah, and is a leading designer and supplier of polycrystalline diamond<sup>1</sup> products for use in drill bits, bearings, and other industrial applications. The polycrystalline diamond may be used to make polycrystalline diamond compacts or "PDCs." PDCs can be shaped as cylindrical parts, as shown in the picture below. Drill bit manufacturers purchase and use PDCs as cutters for rotary drill bits, also shown below.



PDC cutters



Drill bit with PDC cutters

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<sup>1</sup> **P**olycrystalline **d**iamond is often referenced in the industry as "PCD."

26. The PDCs provide a hard, durable cutting surface for earth-boring applications, including drilling for oil and gas resources. PDCs can also be used in other harsh, high-wear, or high-temperature applications, such as thrust-bearing assemblies, radial-bearing assemblies, wire-drawing dies, artificial joints, machining elements, and heat sinks.

27. US Synthetic has invested millions of dollars in the United States in plant/equipment and labor to research, develop, and manufacture polycrystalline diamond and PDC products. US Synthetic is well known as a market leader in PDC technologies.

28. US Synthetic has protected innovative PDC technologies with the patents at issue in this case. US Synthetic's patent rights include the '502 and '565 Patents. US Synthetic is the assignee and owner of each of the patents-in-suit.

29. The '502 Patent is entitled "Polycrystalline Diamond Compact." The '502 Patent issued on December 17, 2019, based on an application (Application No. 16/358,281) filed on March 19, 2019, which is a continuation of Application No. 13/789,099, filed March 7, 2013, now U.S. Patent No. 10,287,822, which is a continuation of 13/623,764, filed on September 20, 2012, now U.S. Patent No. 8,616,306, which is a continuation of Application No. 12/690,998, filed January 21, 2010, now U.S. Patent No. 8,297,382, which is a continuation-in-part of Application No. 12/244,960, filed on October 3, 2008, now U.S. Patent No. 7,866,418. The '502 Patent will expire no sooner than October 3, 2028.

30. The '565 Patent is entitled "Polycrystalline Diamond, Polycrystalline Diamond Compacts, Methods of Making Same, and Applications." The '565 Patent issued on December 17, 2019, based on an application (Application No. 15/080,379) filed on March 24, 2016, which is a continuation of Application No. 13/486,578, filed on June 1, 2012, now U.S. Patent No.

9,315,881, which is a continuation-in-part of Application No. 12/858,906, filed on August 18, 2010, now U.S. Patent No. 9,459,236, which is a division of Application No. 12/244,960, filed on October 3, 2008, now U.S. Patent No. 7,866,418. The '565 Patent will expire no sooner than October 3, 2028.

### **THE ACCUSED PRODUCTS**

31. The Accused Products include PDC products, including products designed for use in the oil and gas industry.

32. The IPDC-UP8N and -UP9N PDC products sold by Defendants are exemplary Accused Products, and by themselves infringe at least the following Asserted Claims of the '502 and '565 Patents:

	'502 Patent	'565 Patent
Infringed Claims	1, 2, 4, 8-11, 15, 21	1-4, 6-10, 14, 15, 18, 22-24

**Table 1.** List of Claims Infringed by the Exemplary IPDC-UP8N PDC Products


33. According to an analysis of sample products and Iljin's own product descriptions, Defendants have infringed and continue to infringe at least the Asserted Claims of each of the Asserted Patents, as set forth in the chart above. Defendants infringe the Asserted Claims of the Asserted Patents literally and/or under the doctrine of equivalents by making and selling products that infringe, by importing those products into the United States to offer them for sale, and/or by selling those products within the United States after importation.

**FIRST CLAIM FOR RELIEF****Patent Infringement of the '502 Patent Under  
35 U.S.C. § 271**

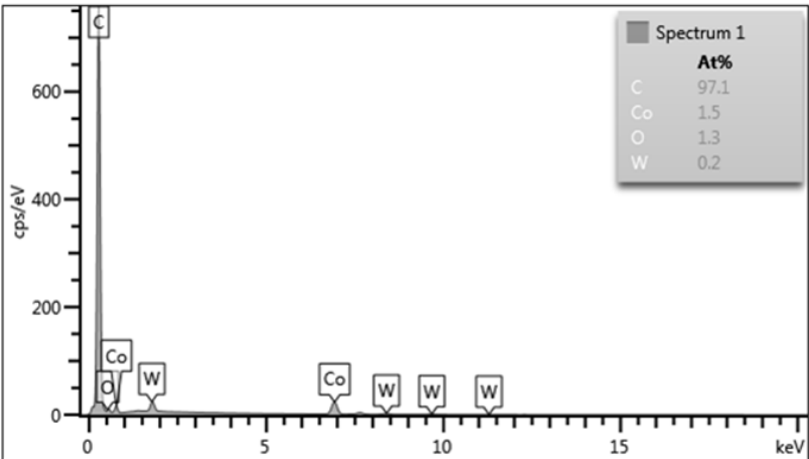
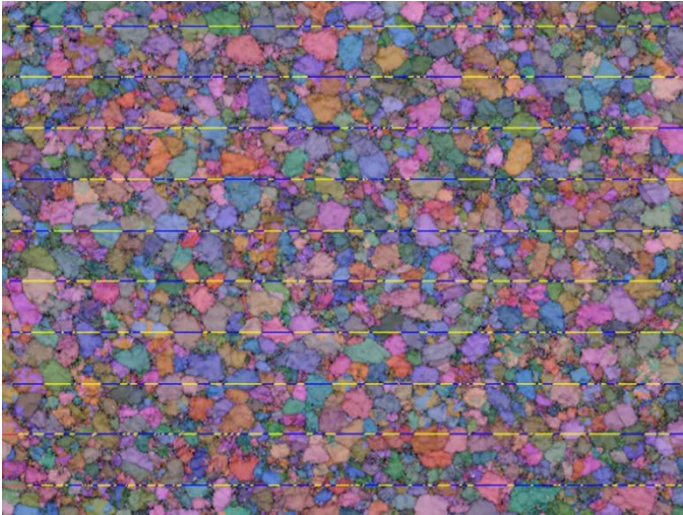
34. US Synthetic incorporates by reference every allegation set forth in the foregoing paragraphs of this Complaint as if fully set forth and restated herein.

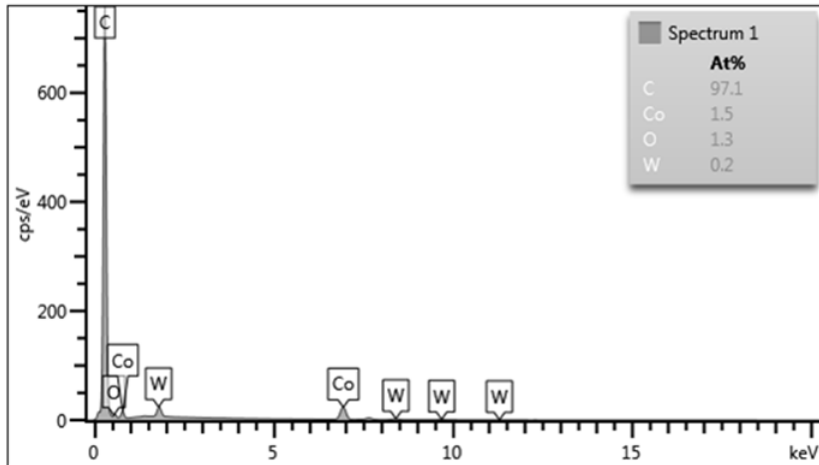
35. Defendants, without the authority or consent of US Synthetic, have been importing, offering to sell and selling, and continuing to offer and sell, in the United States Accused Iljin Products that infringe at least claims 1, 2, 4, 8-11, 15 and 21 of the '502 Patent.

36. The chart below sets forth exemplary infringement contentions for claim 1 of the '502 Patent based at least in part upon testing performed by US Synthetic:

<b>'502 Patent</b>	
<b>Claim 1</b>	<b>Accused Products</b>
[1] A polycrystalline diamond compact, comprising:	 <p>Pictured above is an example of Iljin's IPDC-UP8N cutter. The cutter is a polycrystalline diamond compact.</p>
[2] a polycrystalline diamond table, at least an unleached portion of the polycrystalline diamond table including:	An exemplary IPDC-UP8N cutter includes a polycrystalline diamond table. The polycrystalline diamond table contains at least an unleached region as evidenced by the chart below:



'502 Patent	
Claim 1	Accused Products
	<div></div> <p>The image above shows the presence of at least one metal solvent catalyst, cobalt, in at least an unleached portion of the polycrystalline diamond table of an exemplary IPDC-UP8N cutter.</p>
[3] a plurality of diamond grains bonded together via diamond-to-diamond bonding to define interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 50 $\mu\text{m}$ or less; and	<div></div> <p>The image above shows a plurality of diamond grains of an exemplary IPDC-UP8N cutter. The EBSD average grain size of the imaged region is 4.02 <math>\mu\text{m}</math>.</p>

'502 Patent	
Claim 1	Accused Products
[4] a catalyst occupying at least a portion of the interstitial regions;	 <p>A catalyst occupies at least a portion of the interstitial regions of an exemplary IPDC-UP8N cutter as evidenced by the chart above.</p>
[5] wherein the unleached portion of the polycrystalline diamond table exhibits a coercivity of about 115 Oe to about 250 Oe;	The unleached portion of the polycrystalline diamond table of an exemplary IPDC-UP8N cutter exhibits a coercivity of 160.6 Oe.
[6] wherein the unleached portion of the polycrystalline diamond table exhibits a specific permeability less than about 0.10 G·cm <sup>3</sup> /g·Oe; and	The unleached portion of the polycrystalline diamond table of an exemplary IPDC-UP8N cutter exhibits a specific permeability of 0.084 G·cm <sup>3</sup> /(g·Oe).
[7] a substrate bonded to the polycrystalline diamond table along an interfacial surface, the interfacial surface exhibiting a substantially planar topography;	A substrate bonded to the polycrystalline diamond table along an interfacial surface is present in an exemplary cutter, the interfacial surface exhibiting a substantially planar topography. The ratio of a surface area of an exemplary cutter's planar interfacial surface to a surface area of an exemplary cutter's substantially planar interfacial surface is 0.9543.
[8] wherein a lateral dimension of the	An exemplary cutter exhibits a lateral dimension of 1.59 cm.

'502 Patent	
Claim 1	Accused Products
polycrystalline diamond table is about 0.8 cm to about 1.9 cm.	

**Table 2.** Exemplary Claim Infringement Chart for Claim 1 of the '502 Patent

37. Defendants infringe the Asserted Claims of the '502 Patent directly and indirectly by causing direct infringement in the United States. Defendants will have had knowledge of the '502 Patent and the infringing nature of their Accused Products at least as of the date of service of this Complaint. Defendants infringe through contributory infringement by selling or offering for sale to third parties, such as their customers, products that are material parts of the inventions claimed in the '502 Patent, knowing that they were especially made or especially adapted to practice one or more of the claims of the '502 Patent, and that have no substantial noninfringing uses, and knowing they are in fact used to directly infringe one or more of those claims, at least through the allegations in this Complaint. Defendants also infringe the at least one claim of the '502 Patent indirectly through inducement by, inter alia, importing, offering to sell and/or selling the Accused Products to third parties, including their customers, with the specific intent that those third parties directly infringe one or more of the claims of the '502 Patent. Defendants actively encourage or aid such infringement through various activities, including descriptions on their websites and related materials, and know—at least through the allegations in this Complaint—that the third parties' acts they have induced, and continue to induce, constitute infringement.

38. Defendants' infringement of the Asserted Claims of the '502 Patent has caused and continues to cause damages and irreparable harm to US Synthetic.


## SECOND CLAIM FOR RELIEF

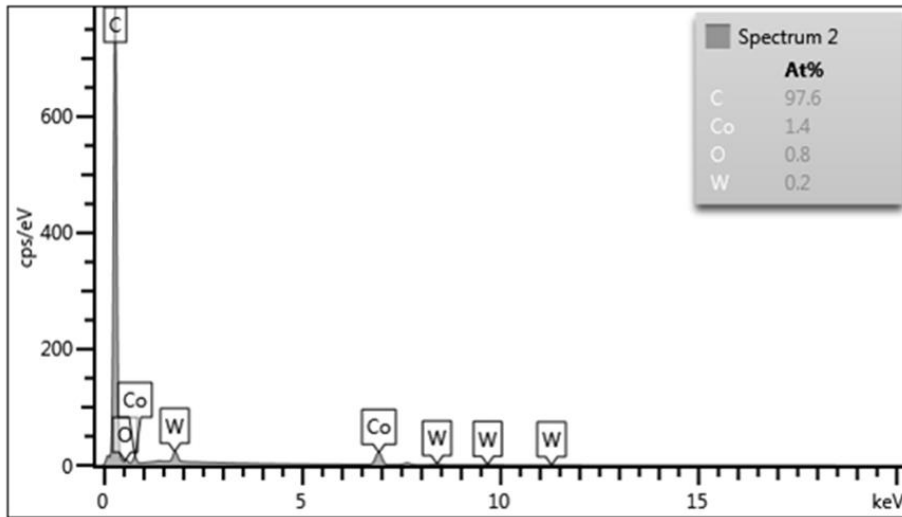
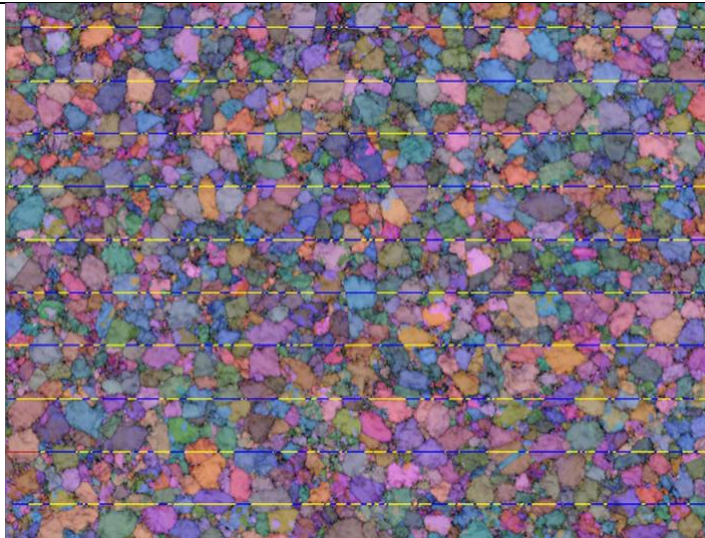
### Patent Infringement of the '565 Patent Under 35 U.S.C. § 271

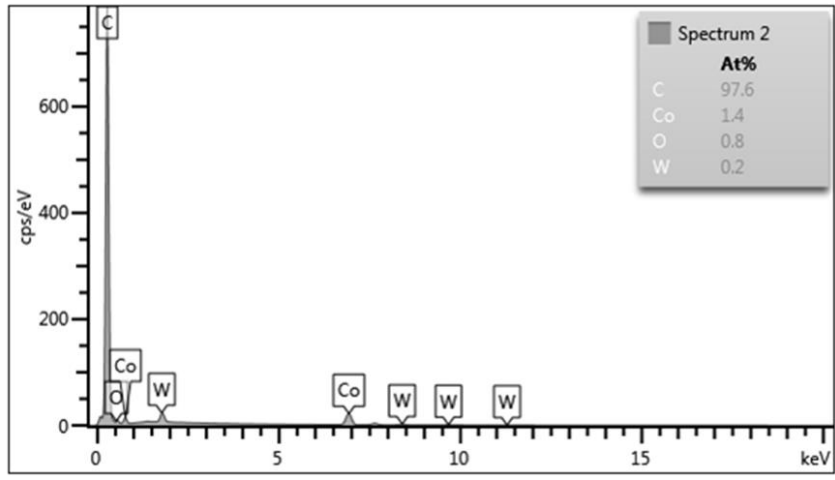
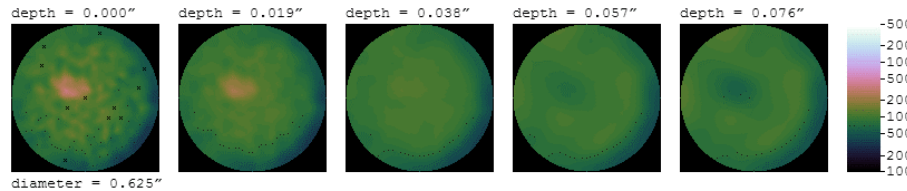
39. US Synthetic incorporates by reference every allegation set forth in the foregoing paragraphs of this Complaint as if fully set forth and restated herein.

40. Defendants, without the authority or consent of US Synthetic, have been importing, offering to sell and selling, and continuing to offer and sell, in the United States Accused Iljin Products that infringe at least claims 1-4, 6-10, 14, 15, 18 and 22-24 of the '565 patent.

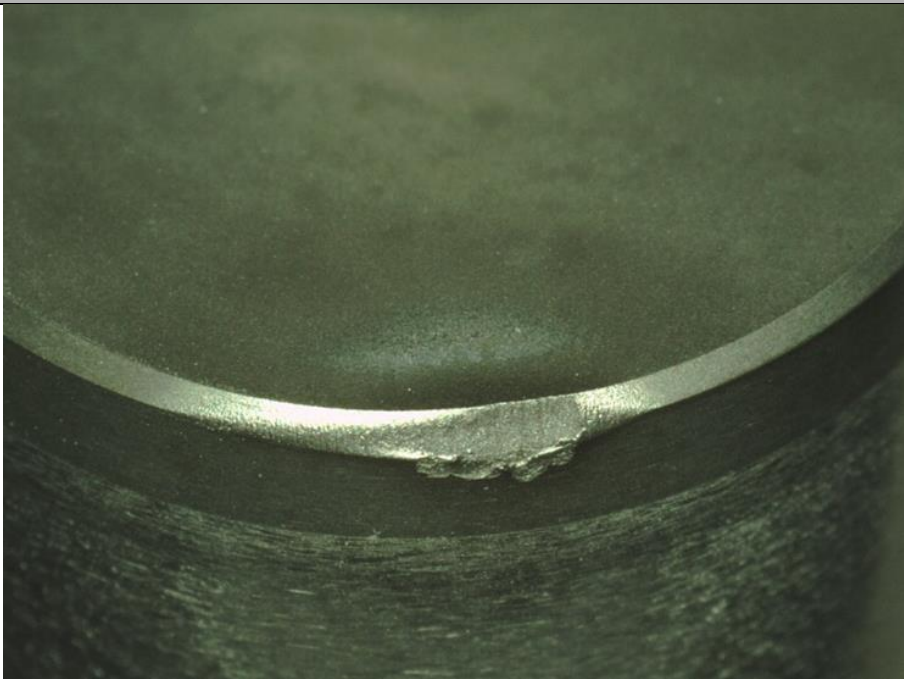
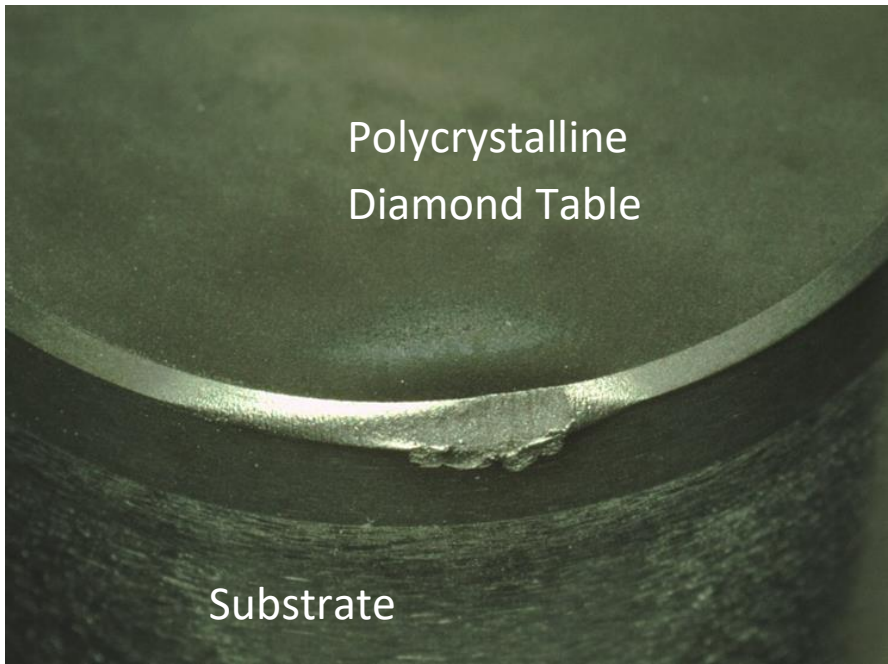
41. The chart below sets forth exemplary infringement contentions for claim 1 of the '565 patent based at least in part upon testing performed by US Synthetic:

'565 Patent	
Claim 1	Accused Products
[1] A polycrystalline diamond compact, comprising:	 <p>Pictured above is an example of Iljin's IPDC-UP8N product. The cutter is a polycrystalline diamond compact.</p>
[2] a polycrystalline diamond table, at least an unleached portion of the polycrystalline	An exemplary IPDC-UP8N cutter includes a polycrystalline diamond table. The polycrystalline diamond table contains at least an unleached region as evidenced by the chart below:

'565 Patent	
Claim 1	Accused Products
diamond table including:	 <p>The image above shows the presence of at least one metal solvent catalyst, cobalt, in at least an unleached portion of the polycrystalline diamond table of an exemplary IPDC-UP8N cutter.</p>
[3] a plurality of diamond grains directly bonded together via diamond-to-diamond bonding to define interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 50 $\mu\text{m}$ or less;	 <p>The image above shows a plurality of diamond grains of an exemplary IPDC-UP8N cutter. The EBSD average grain size of the imaged region is 4.37 <math>\mu\text{m}</math>.</p>

'565 Patent	
Claim 1	Accused Products
[4] a catalyst occupying at least a portion of the interstitial regions;	 <p>A catalyst occupies at least a portion of the interstitial regions of an exemplary IPDC-UP8N cutter, as evidenced by the chart above.</p>
[5] wherein the unleached portion of the polycrystalline diamond table exhibits a coercivity of about 115 Oe or more;	The unleached portion of the polycrystalline diamond table of an exemplary IPDC-UP8N cutter exhibits a coercivity of 163.7 Oe.
[6] wherein the unleached portion of the polycrystalline diamond table exhibits an average electrical conductivity of less than about 1200 S/m; and	<p>8 (number of data points = 2832 of 3440)  average conductivity = 867 S/m, surface conductivity = 885 S/m  min conductivity = 313 S/m, conductivity 98th percentile = 1880 S/m</p>  <p>The unleached portion of the polycrystalline diamond table of an exemplary IPDC-UP8N cutter exhibits an average electrical conductivity of 867 S/m.</p>
[7] wherein the unleached portion of the polycrystalline	The unleached portion of the polycrystalline diamond table of an exemplary IPDC-UP8N cutter exhibits a G-ratio of 2.57E7. The image below shows the cutter following the wet VTL test:



'565 Patent	
Claim 1	Accused Products
diamond table exhibits a $G_{\text{ratio}}$ of at least about $4.0 \times 10^6$ ; and	
[8] a substrate bonded to the polycrystalline diamond table.	 <p>Polycrystalline Diamond Table</p> <p>Substrate</p>

<b>'565 Patent</b>	
<b>Claim 1</b>	<b>Accused Products</b>
	The image above demonstrates a substrate bonded to the polycrystalline diamond table of an exemplary IPDC-UP8N cutter.

**Table 3.** Exemplary Claim Infringement Chart for Claim 1 of the '565 Patent

42. Defendants infringe the Asserted Claims of the '565 Patent directly and indirectly by causing direct infringement in the United States. Defendants will have had knowledge of the '565 Patent and the infringing nature of its Accused Products at least as of the date of service of this Complaint. Defendants infringe through contributory infringement by selling or offering for sale to third parties, such as their customers, products including at least the diamond compacts identified above, that are material parts of the inventions claimed in the '565 Patent, knowing that they were especially made or especially adapted to practice one or more of the claims of the '565 Patent, and that have no substantial noninfringing uses, and knowing they are in fact used to directly infringe one or more of those claims, at least through the allegations in this Complaint. Defendants also infringe at least one claim of the '565 Patent indirectly through inducement by, inter alia, importing, offering to sell and/or selling the Accused Products to third parties, including their customers, with the specific intent that those third parties directly infringe one or more claims of the '565 Patent. Defendants actively encourage or aid such infringement through various activities, including descriptions on their websites and related materials, and know—at least through the allegations in this Complaint—that the third parties' acts they have induced, and continues to induce, constitute infringement.

43. Defendants' infringement of the Asserted Claims of the '565 Patent has caused and continues to cause damages and irreparable harm to US Synthetic.



**DEMAND FOR JURY TRIAL**

Pursuant to Fed. R. Civ. P. 38, US Synthetic respectfully demands a trial by jury on all issues properly triable before a jury in this action.

**PRAYER FOR RELIEF**

WHEREFORE, US Synthetic requests that this Court enter judgment in its favor on each and every claim for relief set forth above and award it relief including, but not limited to, the following:

A. The entry of judgement under 35 U.S.C. § 271(a), (b) and/or (c) that Defendants' making, using, offering to sell, selling or importing of Defendants' Accused Products prior to the expiration of the patents-in-suit will infringe, actively induce infringement, and/or contribute to the infringement of the patents-in-suit under 35 U.S.C. § 271(a), (b) and/or (c);

B. The entry of a preliminary and/or permanent injunction, enjoining Defendants and all persons acting in concert with Defendants from commercially manufacturing, using, offering for sale, or selling Defendants' Accused Products within the United States, or importing Defendants' Accused Products into the United States, until the expiration of the patents-in-suit, in accordance with 35 U.S.C. § 283;

C. The issuance of an order that Defendants deliver up for destruction all infringing products in their possession;

D. An award to US Synthetic of damages adequate to compensate for Defendants' infringement pursuant to 35 U.S.C. § 284, in an amount to be determined at trial, as a result of Defendants' infringement of the patents-in-suit;

E. An order determining that, with respect to Defendants, this case is exceptional and an award of attorney fees, costs and expenses incurred in bringing and prosecuting this case, pursuant to 35 U.S.C. § 285;

F. An award to U.S. Synthetic of its costs in this action; and

G. Any other relief as the Court may deem just and appropriate.

Dated: November 20, 2020

Respectfully submitted,

/s/ Miranda Jones

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